Claims:

1. A method for monitoring the status of an optical transmission path employed in a WDM transmission system and for transmitting service data over the optical transmission path, said method comprising the steps of:

transmitting the service data as an optical service signal carried at a first channel wavelength over the transmission path; and

monitoring status information pertaining to the transmission path by receiving an optical monitoring signal in which said status information is embodied, said optical monitoring signal being carried at said first channel wavelength over the transmission path.

2. The method of claim 1 wherein the monitoring step employs OTDR.

3. The method of claim 1 wherein the optical transmission path comprises first and second unidirectional optical transmission paths having at least one repeater therein.

4. The method of claim 2 wherein the optical transmission path comprises first and second unidirectional optical transmission paths having at least one repeater therein.

5. The method of claim 1 further comprising the step of transmitting a probe signal along the transmission path at said first channel wavelength.

6. The method of claim 2 further comprising the step of transmitting a probe signal along the transmission path at said first channel wavelength, said optical monitoring signal being a backscattered and reflected signal.

7. The method of claim 4 further comprising the step of transmitting a probe signal along the first unidirectional transmission path at said first channel wavelength,

said optical monitoring signal being a backscattered and reflected signal received along the second unidirectional optical transmission path.

8. The method of claim 6 wherein said backscattered and reflected signal traverses an optical loopback path coupling the first and second unidirectional transmission paths.

9. The method of claim 7 wherein said backscattered and reflected signal traverses an optical loopback path coupling the first and second unidirectional transmission paths.

10. The method of claim 9 wherein said optical loopback path is located in said repeater.

11. The method of claim 5 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

12. The method of claim 7 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

13. The method of claim 10 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

14. The method of claim 1 wherein said service signal includes control data.

15. The method of claim 1 wherein said service signal includes status data.

16. The method of claim 1 wherein said service signal includes control and status data

17. The method of claim 14 further comprising the step of transforming the optical service signal to an electrical signal.

18. The method of claim 1 wherein the status information includes information pertaining to discontinuities in the optical transmission path that give rise to optical attenuation.

19. The method of claim 1 further comprising the step of multiplexing customer-data with the optical service signal carried at the first channel wavelength, said customer-data being carried at one or more channel wavelengths different from said first channel wavelength.

20. The method of claim 7 further comprising the step of multiplexing customer-data with the optical service signal carried at the first channel wavelength, said customer-data being carried at one or more channel wavelengths different from said first channel wavelength.

21. The method of claim 12 further comprising the step of multiplexing customer-data with the optical service signal carried at the first channel wavelength, said customer-data being carried at one or more channel wavelengths different from said first channel wavelength.

22. A method for monitoring the status of an optical transmission path employed in a WDM transmission system and for transmitting service data over the optical transmission path, said method comprising the steps of:

transmitting the service data as an optical service signal carried at a first channel wavelength over the transmission path; and

transmitting an optical probe signal for obtaining status information pertaining to the transmission path, said optical probe signal being carried at said first channel wavelength over the transmission path.

23. The method of claim 22 wherein the optical probe signal is an OTDR test signal.

24. The method of claim 22 wherein the optical transmission path comprises first and second unidirectional optical transmission paths having at least one repeater therein.

25. The method of claim 23 wherein the optical transmission path comprises first and second unidirectional optical transmission paths having at least one repeater therein.

26. The method of claim 22 further comprising the step of receiving an optical monitoring signal along the transmission path at said first channel wavelength.

27. The method of claim 23 further comprising the step of receiving an optical monitoring signal along the transmission path at said first channel wavelength.

28. The method of claim 24 further comprising the step of receiving an optical monitoring signal along the transmission path at said first channel wavelength.

29. The method of claim 28 wherein said optical monitoring signal is a backscattered and reflected signal received along the second unidirectional optical transmission path.

30. The method of claim 29 wherein said backscattered and reflected signal traverses an optical loopback path coupling the first and second unidirectional transmission paths.

31. The method of claim 30 wherein said optical loopback path is located in said repeater.

32. The method of claim 22 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

33. The method of claim 28 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

34. The method of claim 30 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

35. The method of claim 22 wherein said service signal includes control data.

36. The method of claim 22 wherein said service signal includes status and control data.

37. The method of claim 22 wherein said service signal includes control and status data

38. The method of claim 35 further comprising the step of transforming the optical service signal to an electrical signal.

39. The method of claim 22 wherein the status information includes information pertaining to discontinuities in the optical transmission path that give rise to optical attenuation.

40. The method of claim 22 further comprising the step of multiplexing customer-data with the optical service signal carried at the first channel wavelength, said customer-data being carried at one or more channel wavelengths different from said first channel wavelength.

41. The method of claim 30 further comprising the step of multiplexing customer-data with the optical service signal carried at the first channel wavelength, said customer-data being carried at one or more channel wavelengths different from said first channel wavelength.

42. The method of claim 33 further comprising the step of multiplexing customer-data with the optical service signal carried at the first channel wavelength, said customer-data being carried at one or more channel wavelengths different from said first channel wavelength.

43. A WDM optical communication system, comprising:

a transmitting terminal for transmitting customer data as an optical data signal carried at one or more channel wavelengths and service data as an optical service signal carried at a first channel wavelength different from said one or more channel wavelengths;

a receiving terminal;

an optical transmission path optically coupling the transmitting and receiving terminals, said optical transmission path having at least one optical amplifier therein; and

line monitoring equipment for obtaining, at said first channel wavelength, status information pertaining to the transmission path.

44. The WDM optical communication system of claim 43 wherein said line monitoring equipment is an OTDR data acquisition arrangement.

45. The WDM optical communication system of claim 43 wherein the optical transmission path comprises first and second unidirectional optical transmission paths having at least one repeater therein.

46. The WDM optical communication system of claim 44 wherein the optical transmission path comprises first and second unidirectional optical transmission paths having at least one repeater therein.

47. The WDM optical communication system of claim 44 wherein said OTDR data acquisition arrangement includes a transmitter for transmitting an optical probe signal along the transmission path at said first channel wavelength.

48. The WDM optical communication system of claim 46 wherein said OTDR data acquisition arrangement includes a transmitter for transmitting a probe signal along the first unidirectional transmission path at said first channel wavelength, said optical monitoring signal being a backscattered and reflected signal received along the second unidirectional optical transmission path.

49. The WDM optical communication system of claim 48 wherein said backscattered and reflected signal traverses an optical loopback path coupling the first and second unidirectional transmission paths.

50. The WDM optical communication system of claim 49 wherein said optical loopback path is located in said repeater.

51. The WDM optical communication system of claim 47 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

52. The WDM optical communication system of claim 48 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

53. The WDM optical communication system of claim 50 wherein said probe signal and said service signal are time-division multiplexed at the first channel wavelength.

54. The WDM optical communication system of claim 43 wherein said service signal includes control data.

55. The WDM optical communication system of claim 43 wherein said service signal includes status data.

56. The WDM optical communication system of claim 43 wherein said service signal includes control and status data

57. The WDM optical communication system of claim 54 further comprising the step of transforming the optical service signal to an electrical signal.

58. The WDM optical communication system of claim 43 wherein the status information includes information pertaining to discontinuities in the optical transmission path that give rise to optical attenuation.

59. The WDM optical communication system of claim 43 wherein said transmitting terminal includes a multiplexer for multiplexing the customer-data with the optical service signal.

60. The method of claim 1 wherein the optical service signal is encoded as a pseudo-random signal.

61. The method of claim 22 wherein the optical service signal is encoded as a pseudo-random signal.

62. TheWDM optical communication system of claim 43 wherein the transmitting terminal includes an encoder for encoding the optical service signal as a pseudo-random signal.